

Lesson 3: Designing Plant-Inspired Water Saving Techniques

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Grade Level(s)

First, Second, Third

Lesson Overview

Students will combine their knowledge from plants and some of the inadequacies of human methods of storing, collecting, and recycling water to make a new solution.

Learning Objectives

Students will design and test a prototype that improves a current human technique for storing, collecting, or recycling water.

Standards

- NGSS 3-ESS3-1: Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.
- NGSS K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- NGSS 1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Preparation

- Gather charts created by students in the previous two lessons.

Materials and Resources

- Building materials: cardboard, cups, aluminum foil, plastic sheets, etc.
- Gloves
- Petroleum jelly

- Light sources (If wanting to experiment with some)
- Images of drought-stricken areas
- Link to the “Don’t Waste a Drop” project video.
(<http://www.samsung.com/us/solvefortomorrow/project/california-dont-waste-a-drop.html>)
- Blank paper
- Prototype Feedback Sheet (see below)

Prototype Feedback Sheet example

	What works? (Would it keep water well? Would it recycle water well?)	What doesn't work so well? (Can water easily escape in this design?)	What plant techniques might help?
Prototype 1	Collects water on the leaves and falls.	There are many holes where water can leave.	Can make a shield that keeps the air from leaving, like wax.
Prototype 2			
Prototype 3			

Activity 1: Human Collection/Recycling of Water “Notice and Care,” Continued

1. Share with students that humans have come up with other ways to collect and recycle water, even students!
2. Show students the video, “Don’t Waste a Drop.”
 - a. Define for students what grey water is, and if helpful draw a simple diagram on the board.
 - b. Reflect with students on what these high school students accomplished.
3. Share with students information and diagrams about roof water harvesting, and some homes that completely filter and reuse their water.
4. Review their findings from the “Human Solutions and Plant Adaptations” chart in the previous lesson.

Activity 2: Work Together and Create (45 minutes)

1. Share with students that they will be improving ways, or inventing a new way, to collect, store, or recycle water. They can combine some of the existing approaches. However, they must use some of the amazing techniques plants use to collect, store, or recycle water.
2. Distribute a blank sheet of paper and a prototyping feedback sheet. Students will use the blank paper to first create a sketch to give them a starting point to prototype.
3. Once students have started prototyping, gather their attention and share with them that once they have completed a prototype, they should have others test their idea. Testers could include administrators, teachers, or other students in the classroom.

Let them know that they will use the prototype feedback sheet to ask their testers for help in improving their design.

4. After students have had time to test and improve their prototypes, have students save their final prototypes to share with the class.

Activity 3: Close

1. Have students share out what their prototypes are and how they work. Students will explicitly share what techniques they used from plants to make their prototype.
2. Once all students have shared, reflect as a group on how plants have been able to keep, store, and collect water so efficiently for survival. Thank the students for their designs and their ideas on how we can better improve conserving, storing, and recycling water to better deal with drought.

Assessment

Students will complete the prototype feedback sheet, complete revised prototypes, and present their prototypes to the class.